

**EXHIBIT 13**  
**PP. 60-89**

Once style sharing is enabled, any changes you make to the folder are immediately applied to all elements within the folder.

**Note:** Any individual style differences for selected placemarks will be lost once universal styles are applied.

## Saving and Sharing Your Places and Folders

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You can save and share your places with other people in a number of ways:

- [Saving an Image to Your Computer](#)
- [Saving a Placemark or a Folder](#)
- [Emailing a View or Placemark](#)
- [Sharing Placemarks Over the Network](#)

### Saving an Image to Your Computer

You can save the image of your current view to your computer's hard drive for later use. The image is saved in JPG format. Follow the steps below.

1. Select Save Image from the File menu, or type **Ctrl+S**.  
A Generating Image dialog appears, followed by a file dialog box when the image has been generated.
2. Use the dialog box to navigate to the place where you want to save your file, name the file, and click **OK**.

Alternatively, you can use the Copy View feature under the Edit menu to copy the current view to your computer's clipboard. Using an image editor such as Microsoft Paint or Adobe Photoshop, you can paste the image into an open file. As with the Save Image option, the image is saved in JPG format.

**Note:** The Save Image option takes more time to produce an image than the Copy View option, but the resultant image has a higher-resolution than the image produced from the Copy View option, which is screen resolution only. If you want to print the image that you have saved to your computer, use the Save Image option for a higher-quality print.

### Saving a Placemark or a Folder

You can use the Save option to save individual placemarks or entire folders using to your computer. The placemark file or folder is saved as a single file in KML format, which you can open at any time with your Keyhole client.

To save placemarks or folders, follow these steps:

1. Right-click on a placemark or folder and select Save from the pop-up menu.

**Note:** Select Save As... from the pop-up menu if you have already saved the placemark or folder and you want to save the data under a different file name, or if the item already exists in the My Places folder.

2. Use the file dialog to navigate to where you want to save the placemark or folder.
3. Enter the name you want to give to the placemark or the folder, and click Save in the Windows dialog.

The placemark or the folder is saved to that location with an extension of .kml.

**Note:** For Save operations, the file dialog appears only the first time you save a placemark, folder, or other feature. Once you specify the location and file name of the item, you can save additional edits without re-entering the location and name. If you make edits to an item and you want to save those edits in a different file, select Save As from the pop-up menu.

You can later email the KML file to another Keyhole client user. When the recipient opens the file, he or she will have access to the same data that you do.

**Note:** When you email KML files that reference custom icons or image overlays not available via a network or the World Wide Web, you must also send those files to the recipients if you want them to see that data as well. In addition, the KML must correctly reference the overlay image or icon.

You can also share your placemark files with other Keyhole client users by posting them to a shared web server, such as the Keyhole bulletin board. See "[Posting Overlay Data to a Shared Web Server](#)" on page 98 of [Using Custom Imagery In Keyhole](#) for more information on posting files in this manner.

**Important:** Placemarks created with Keyhole version 2.0 or higher cannot be viewed in older clients. As an alternative, you can send an image file.

## Emailing a View or Placemark

You can email a view as a placemark file for other users of the Keyhole client software, or as an image file only. Follow these steps.

1. Select Email View from the File menu, or type Ctrl+E, or click on the email icon on the navigation panel.

2. Choose how you would like to send the view.



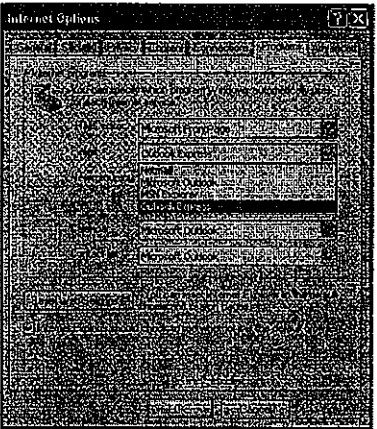
If the recipients of the email also have the Keyhole client, you might send them a placemark file so that they can explore the view in their Keyhole client. If the recipients do not have the Keyhole software, send an image file.

**Note:** If you are sending a placemark file to a user of a Keyhole client version 1.7 or lower, the recipient will not be able to view the placemark. The file format for placemarks has changed for Keyhole client versions 2.0 and higher. Send an image file instead.

3. Wait while the Keyhole software sends the data to your email application. A new email window appears with the image file or placemark file as an attachment. (This can take a few seconds.) If you choose Email image, the image is a JPG file of the current view in your viewer.
4. Fill in the recipient's email address and any other information in the body and send the email.

① **If your email application does not respond to the Email View command, you need to configure the Internet Options setting on your Internet Web browser.**

To do this for Microsoft IE browsers, select Internet Options from the Tools menu and click on the Programs tab. Select the default email program that you use from the Email drop-down list and click Apply. You should now be able to send a view.



## Sharing Placemarks Over the Network

In addition to saving placemarks or folders to your local computer, you can also save placemarks or folder on a web server or on a network and share the KML file with other Keyhole client users. Similarly, you can create shortcuts to KML files that are stored on the network or made available on a web server.

**Note:** When you save an individual placemark or an entire folder to a network location, it is saved as a single file with a .kml extension. Whether the information in the KML file is a single placemark, or multiple folders containing multiple placemarks and overlays, all the data is stored in a single file.

Storing a placemark file on the network or on a web server offers the following advantages:

- **Accessibility**

If your placemark file is stored on a network or the Web, you can access it from any computer anywhere, provided the location is either publicly available or you have a login access.

- **Ease in Distribution**

You can develop an extensive presentation folder in the Keyhole client and make that presentation available to everyone who has access to your network storage location or web server. This is more convenient than emailing the data when you want to make it available to a large number of people.

- **Immediate Updates**

Any new information or changes you make to a network-based KML information is immediately available to all users who access the KML data via network link. See "[Creating a Network Link](#)" on page 64 for more information.

- **Backup**

If for some reason the data on your local computer is corrupted or lost, you can open any of the KML files that you have saved to a network location, and if so desired, save them as a local file again.

## Saving a Placemark or Folder to the Network

To make your placemarks or folders available to other people, you need to first save the file to the appropriate location. To save a folder or placemark to a network folder, simply follow the steps above in "[Saving a Placemark or a Folder](#)" on page 60 and

save the file in a location on your company network rather than to your local computer.

Alternatively, if you want to save a placemark or folder to a web server, first save the file to your local computer as described above in ["Saving a Placemark or a Folder"](#) on page 60. Once the file is saved on your local computer as a separate KML file, you can use an FTP utility to transfer the file to the web server.

**Tip:** There are special considerations when you save KML data to the network or to a web server where the KML references custom icons or overlays. If you plan to share any KML files that reference custom imagery, it's best to first place any imagery you use on an accessible network or web server. That way, when you publish the placemark or folder to the network, the imagery will already be appropriately referenced and available to the KML.

If you have already created folders and placemarks that reference images on your local computer and you want to share the KML file, you will need to do two things:

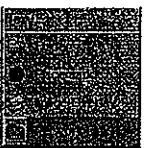
- **Post the referenced images** to an available web server or network location
- **Edit the placemark** in the Keyhole client to correctly reference the image files located on the network or web server

## Creating a Network Link

To view a KML file on the network without manually copying it over to your local computer, you can create a network link to reference the file. Accessing network-based KML information this way ensures that any updates made to the information on the network can be quickly reflected in any Keyhole client that references the link. In this way, a network link functions as both a means to publish Keyhole data to multiple users and easily facilitate distribution of that data.

Follow the steps below to create a KML shortcut.

1. Click on the New button and select Network Link from the pop-up menu.  
The New Network Link dialog appears.
2. Enter the name of your link in the Name field.
3. Enter the location of the KML file in the URL or Filename text box, or browse to the file location if the file is located on the network.  
The view in the Keyhole client immediately flies to the default view for the linked Keyhole data.



4. Select the Refresh Period from the choices.

The refresh period indicates how often the Keyhole client should reload the values stored in the KML file. You can set the refresh period according to how often the contents of the KML file will change.

5. Enter descriptive text or HTML.

You can enter this data in the same way you would for a regular folder. See "[Using Folders](#)" on page 49 for more information.

6. Set advanced information, if desired.

Two possible advanced settings are available if you check the Advanced checkbox:

- **View**

Set the view for the top-level linked folder as you would for any folder. See "[Setting the View for a Placemark or Folder](#)" on page 52 for more information.

- **Style**

Style information is only available when the items within the linked KML file are all of the same type, such as all placemarks, or all overlays. If there are a mixture of items within the linked folder, no style information will be available. However, once you link the top-level folder, you can edit the information in any child folder and set style information for it, if available.

For more information on styles and how to use them, see "[Setting the Style for Placemarks and Folders](#)" on page 55 or "[Modifying Vector Data Display](#)" on page 123 of Keyhole Premium Features.

## Importing Places from Older Keyhole Clients

If you are upgrading from a version of the Keyhole client prior to 2.0 and you want to import placemarks, or if someone has emailed you a placemark that you have saved to your computer, you can open them in the Keyhole client (2.0 or higher) as described here.

Follow these steps to import My Places placemarks from a version of the Keyhole client prior to version 2.0.

1. Find the `myplaces.ini` file in your earlier version of the Keyhole client

This file is located in the program folder that contains your earlier version of the Keyhole client. For example, if you have Keyhole Pro, the `myplaces.ini` file would be located in the `Keyhole PRO` folder. Typical installations place

these folders in the Program Files folder of your computer's hard drive (e.g. C:\Program Files\Keyhole\Keyhole PRO).

2. Open this file using the newer version of the Keyhole client.

You can either drag the myplaces.ini file onto the My Keyhole tab of the Keyhole client, or you can click on the Open button beneath the My Keyhole tab, navigate to the myplaces.ini file, and double-click it.

The name of the imported folder appears in the My Keyhole tab.

3. Double-click on the folder to expand the items it contains, and double-click on the placemarks to fly to them.

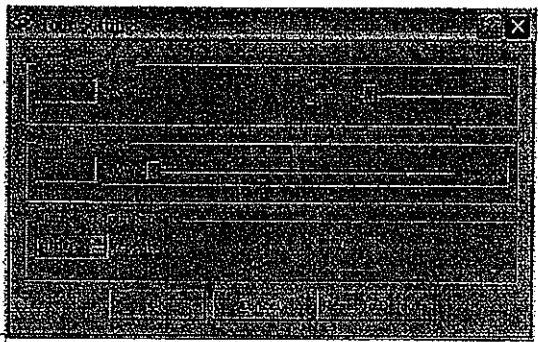
**Important:** Placemarks that are opened in the Keyhole client must be explicitly saved if you want to view them in subsequent sessions. To do this drag the folder to the My Places folder. After doing this, you can right-click on the folder to change its name or edit it as you would any item. Alternatively, you can edit the folder and its contents and save it as described in "[Saving a Placemark or a Folder](#)" on page 60.

## Touring Places

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You can tour your placemarks by selecting the check box next to desired placemarks in the My Keyhole list and clicking on the Play button in the Tour area of the My Keyhole tab. The Keyhole software flies to each selected location in succession, pausing briefly before moving onto the next. To stop the tour, click on the Stop button in the My Keyhole tab.

You can also adjust the speed at which touring takes place. To do this, click on the Prefs button under the Tour section of the My Keyhole tab. The Tour Setting window appears.



Here, you can set the time in seconds for the tour to pause at each stop, the speed at which the viewer flies to each destination, and the number of times the tour should

repeat. For the Autopilot Speed, the default value is 0.1. Recommended ranges are from .05 to 1.0. You can also set the number of times to have the tour repeat.

Click the Reset to Default button to restore the tour mode settings to their original state.



# 5

# Keyhole Layers

The Keyhole client offers a number of features that you can use to adjust the display of the geographic scene in the viewer. Want to see roads? Turn on the road data information. Curious about the number of restaurants in the area? Turn on the restaurant listings.

Using the streamed layers in the Keyhole client, you can view:

- High-Resolution and World Places
- Points of Interest
- Map Features

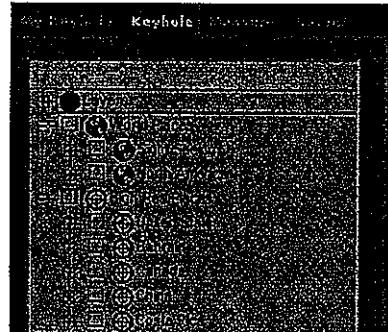
**Tip:** When engaging the geographic and points of interest features of the Keyhole client, it helps to keep adjusting the viewing altitude on a region in order to clearly see all labels and icons that you have selected. Not all selected features are visible at certain elevations from a region, so zooming in often improves their display.

## High-Resolution and World Places

The Keyhole tab displays the World Places and High Res Places folders that are automatically streamed when you connect to a Keyhole Server. You can expand these folders to see hundreds of pre-marked locations around the world. To go to one of the places, double-click on the entry. Select the check box next to the folder containing the items you want to view, or select individual listings to show in the viewer.

The World Places folder contains two primary sub-folders—Sight Seeing and North America. You can expand these folders to explore the pre-defined places within.

The high-resolution places include places where the base map resolution is 3-meter or better. The sub-folders within contain high-resolution places from all over the



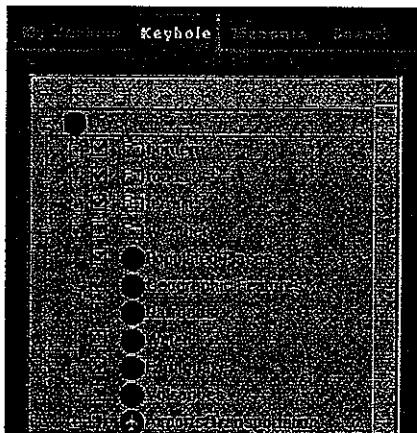
world. For more information on resolution, see “[Base Resolution](#)” on page 109 of [Keyhole Imagery](#).

**Note:** You cannot edit, move, or delete any of the high-resolution or world places.

## Points of Interest

You can also use the **Layers** folder to turn on markers for a wide variety of information available for the current view, including:

- **Businesses**, such as banks, pharmacies, and gas stations
- **Restaurants** of a variety of styles
- **Parks, recreation areas, golf courses**, and geographic features
- **Airports, government offices**, and school districts
- **Census studies, crime statistics**, and postal code boundaries



This section covers how to view points of interest in the Keyhole client.

## Displaying a Point of Interest

Follow these steps to find a particular point of interest in your viewing region.

1. Adjust your viewer to encompass the area you want to investigate. If you are interested in finding all the schools in a particular city, then adjust the viewer so that you can view the entire city. You can do this by zooming out, or by expanding the size of the viewer itself using the adjustment arrow or the window controls on the right bottom corner of the viewer.
2. Double-click on the **Layers** folder to expand it.
3. Select one or more points of interest in the list.

If there is a point of interest or business of the selected type in the viewing area, that icon appears in the viewer. Certain selections—such as a geographical feature like a lake—do not always produce a distinguishable icon, but will instead display a label near the corresponding area.

**Tip:** If you are sure that an icon that you have selected should appear in the viewing region and it does not, adjust your view by zooming in on the region. Like road data, location data appears at different viewing heights.

Additionally, if you have selected a number of icons, they can overlap each other until you zoom in to a level that allows both icons to appear.

## Interacting with and Saving Points of Interest

Once a point of interest is displayed in the viewer, you can point your mouse on the icon and right-click on it. A pop-up menu appears, from which you can do the following:

- Select **Copy to My Places** to save the POI to your places folder
- A **web search option** of that location or business, where you can find the web site for the place, if any is available

If you find the viewing area to be a bit "crowded" when you select many points of interest, you can adjust the size of the icons and labels in the Keyhole Preferences. In the View tab, an area called **Labels/Icons Size** determines the general size of these items in the viewer. You can set the size to **Small**, **Medium**, or **Large**, and apply it to the active view.

**Tip:** Adjust the size up in order to see some labels or icons that don't appear when a smaller size is selected.

## Map Features

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Once you have a particular location that you are exploring in the viewer, you might want to modify the map controls to display different data. For example, suppose you are looking at the map data for a city that you plan to visit soon. You might want to turn on road information to see the best route to the city.

This section covers how to set and use the Keyhole map controls.

### Roads

The road layer displays road map information for the viewing area, including major highways, county roads, and streets. This option is available both in the **Layers** folder and on the navigation panel of the Keyhole client. In the **Layers** folder, you can expand the **Roads** folder and control the display for highways, roads, international roads, and Canadian roads.

While road information for a given view is always available, it is displayed in the viewer when a logical distance is reached. For example, if you are looking at a very large region, such as the southern area of a state, you see only major highways. When

you zoom in to a more confined region, you see labels for those highways, as well as smaller highways and roads.

**Tip:** If you cannot see the label for a highway or a road, adjust the zoom level of your viewer until the label appears. Typically, you will need to zoom in to see the label.

## Terrain

The terrain layer shows 3D elevation data for the viewing region. Elevation data is limited to natural geographic features, like mountains and canyons, and does not apply to buildings. Turn this feature on to get an even clearer image of your favorite ski resort or canyon trail.

**Tip:** Because terrain data is additional information, more time is needed to download this information to your Keyhole client. If you are not interested in viewing terrain data, turn this layer off for faster drawing to the viewer.

You can turn terrain on by checking on the Terrain item in either the Layers folder or on the Keyhole navigation panel.

You can also adjust the appearance of the terrain if you would like the elevation to appear more pronounced in your views. To do this, select the View tab in the Preferences, and modify the Elevation Exaggeration value. The default value is set to 1, but you can set it to any value from 1 to 3, including decimal points. A common setting is 1.5, which achieves an obvious yet natural elevation appearance.

## Borders

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You can turn on border information by checking the Border radio button in the Keyhole navigation panel, or by checking the Borders folder in the Layers tab. The Border radio button turns on all possible borders, while you can expand the Borders folder to have individual control over the following types of borders:

- County
- State and province names
- Countries and capitals
- International boundaries

When turned on, border information for a given view is always available. However, as with road data, it is displayed in the viewer when a logical distance is reached. For example, if you are looking at a very large region, such as the southern area of a country, you see only major boundaries. When you zoom in to a more confined region, you might see state or county labels depending upon your viewing elevation.

## 6

## Measuring and Estimating Sizes

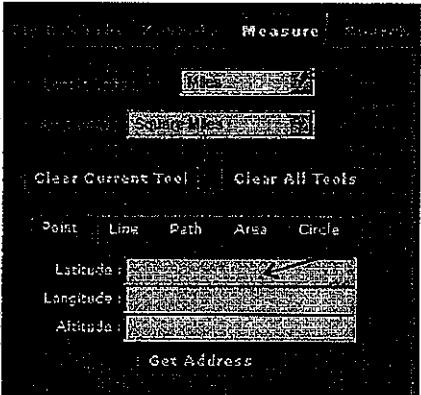
The Keyhole client provides a set of functions to measure distances, get an address, estimate sizes, and pivot around a single viewpoint. Using these features, you can:

- Pick a point and get its latitude, longitude, and altitude.
- Specify a point to determine the view from that point in all directions.
- Draw a circle, a line, a path, a polygon and view its measurements.

**Important:** The coordinates, elevations, distances, and measurements provided by the Keyhole software are approximations only. Keyhole, Inc. makes no claims as to the accuracy of these measurements, which are not intended for engineering-level requirements.

Using the tools in the Measure tab, you can determine the latitude, longitude, and altitude of a point that you click on.

With the Measure tab active, click on the Point tab and left-click on the desired point in the viewer. The longitude, latitude, and altitude appears in the fields.



Here, the length unit applies to the Altitude field only. You can select from the available units to view the altitude in other measurements, such as feet or kilometers.

To remove the existing line and draw another, click the Clear Current Tool button.

The latitude and longitude measurements are displayed here in standard lat-lon projection with WGS84 datum. Keyhole uses *simple cylindrical projection* (or Plate Carrée), which is a simple map projection where the meridians and parallels are equidistant, straight parallel lines, with the two sets crossing at right angles.

To retrieve the address for the selected point, click the Get Address button. See "Reverse Address Lookup" on page 37 of *Searching Locations and Listings*.

You can move freely between these measuring modes and navigation modes and the shapes will not disappear from the viewer until you press the Clear Current Tool

button for a selected shape or the Clear All Tools button. Shapes also appear when you print the viewer image.

**Note:** You can have one shape of each type in the viewer at the same time.

## Drawing a Line

You can use the line mode with terrain on or off, although the most accurate measurement with the line mode is with terrain turned off. To measure distances over elevation, use the path tool.

To create a line, follow these steps.

1. Once in the Measure tab, click on the Line tab to bring it to the front.
2. Position the imagery you want to measure so that the beginning and ending points are completely within the viewer.
3. Click *and release* the left mouse button to establish the beginning point of the line.

A red dot will indicate the beginning point, and a yellow line connects to it as you move the mouse.

**Note:** You can also reposition the viewer while you have a measuring tool selected. If you click and drag the mouse without releasing the mouse button, you can reposition the viewer. No measuring feature will be activated. If you want to draw a line without repositioning the viewer, be sure to *click once and release* the mouse to establish an end point for a line.

4. Move the mouse until you reach the end point of the line.

The length of the line appears in the Distance field as you drag the line, and the geographical coordinates are updated as the line is drawn.

5. Click once and release to establish the end point of the line.

You can modify the line by clicking once on either end point and dragging it in the direction you want. The length of the line appears in the Distance field beneath the Line tab. You can choose from the options in the Length Units pull-down menu to see the line length in different units.

To clear the line, press the Clear Current Tool button.



## Drawing a Path

Using the Path measuring tool, you can draw multiple lines and measure their total distance. The path tool is useful for measuring boundaries and roads, and can be used with terrain turned on. Follow these steps to create a path.

1. Click on the Measure tab and then the Path tab to bring it to the front.
2. Position the imagery you want to measure so that the beginning and ending points are completely within the viewer.
3. Click *and release* the left mouse button to establish the beginning point of the line.

A red dot indicates the beginning point, and a yellow line connects to it as you move the mouse.

**Note:** You can also reposition the viewer while you have a measuring tool selected. If you click and drag the mouse without releasing the mouse button, you can reposition the viewer. No measuring feature will be activated. If you want to draw a line without repositioning the viewer, be sure to *click once and release* the mouse to establish an end point for a line.



4. Left-click another point on the screen to connect a line between these points, and continue in this manner until you've drawn the desired shape.

The length of the path appears in the Length field in the unit of measure selected in the Length Units pull-down.

To adjust any point on the path, position the cursor over the point until it changes to a hand. (The point turns green to indicate that it is active.) Click and drag the point to the desired position.

To delete the line, press the Clear Current Tool button. To delete the last segment of a line, right-click on the segment.

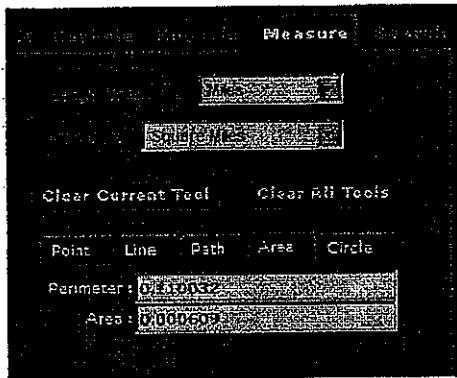
## Measuring the Area of a Region

You can use the Area tab to draw a shape with multiple sides, such as a triangle, square, or any multi-sided shape designed to encompass an area in the viewer. Follow these steps to create a polygon.

1. Click on the Measure tab, and click on the Area tab to bring it to the front.
2. Position the imagery you want to measure so that the entire area you want to measure is completely within the viewer.
3. Click *and release* the left mouse button to establish the beginning of the area shape.

A red dot appears to indicate the starting point.

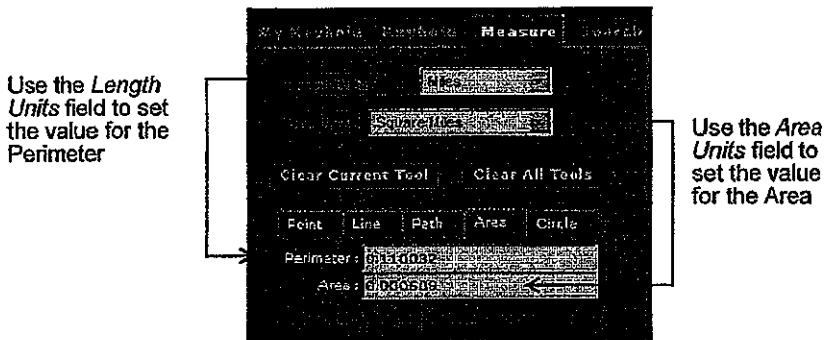
4. Click and release the mouse button to create the next side of the polygon, and continue in this manner until you've drawn the desired shape.



Once you create the third point of the shape, the lines connect to create a polygon. For each subsequent point that you make in the area, the polygon adjusts shape to include the new point.

**Note:** You can also reposition the viewer while you have a measuring tool selected. If you click and drag the mouse without releasing the mouse button, you can reposition the viewer. No measuring feature will be activated. If you want to draw a line without repositioning the viewer, be sure to *click once and release* the mouse to establish an end point for a line.

You can view two measurements with a polygon—the perimeter and the area. Each measurement can be independently set, as shown below.



Click the Clear Area button to remove the polygon.

## Drawing a Circle

Use the circle measurement feature to view the geographical coordinates of the center of the circle, the length of the radius and circumference of the circle, and the area of the circle. As with polygon measurement, you can set the area measurement units for the circle independently from the radius and circumference measurements. Follow these steps to use the circle mode.

1. Turn off the terrain by clicking on the 3D Terrain button.

**Note:** Measuring with the Circle tool is more effective with terrain turned off.

2. Click on the Measure tab and the Circle tab to bring it to the front.
3. Click *and release* the left mouse button.  
The pointer will change to a hand to indicate that you are in circle mode.
4. Move the mouse (without the button pressed down) from a center point outward to create the circle.
5. Click and release the left mouse button to establish the end radius of the circle.

You can view the coordinates and altitude of the center point of the circle in the Measure tab on the left. You can also view and adjust the length and area units for the circle.

To re-position the circle, move the cursor over the very center of the circle (at the end of the radius line). The mouse pointer will change to a hand to indicate that the center is selected. Click and hold the mouse button to drag the circle to its new position. Release the mouse button.

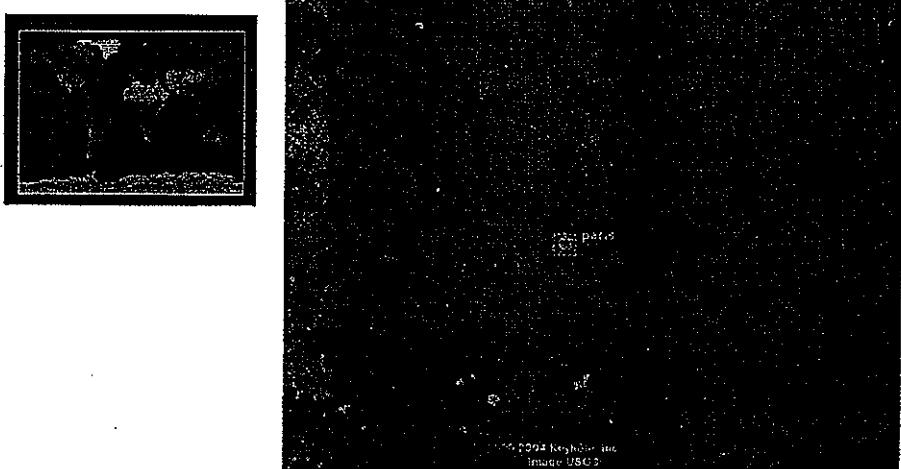
To re-size the circle, move the cursor over the circumference of the circle until it changes to a hand. Click and hold the mouse button and resize the circle as desired. Click and release to set the new size of the circle.

## 7

## Using the Overview Map Feature

The overview map features provides an additional map of the entire earth with a position indicator that corresponds to the display inside the Keyhole client 3D viewer. With the overview map, you can easily determine the position of the current view in relation to the earth. For example, if you select a placemark and zoom into a confined region such as a city, you can look to the Overview window to see the position of the current view. If you pan and "throw" the view so that it glides over the map, or if you start a touring mode, the overview map will continually adjust to indicate the relative position of the view.

In the following example, the Keyhole client 3D viewer is positioned over the city of Paris, France. The Overview window has a cross-hair marker to indicate the position of the view in relation to the entire earth.



If the view zooms out to encompass a larger region, such as the country of France, the cross-hair marker changes to a small red box to indicate the entire region in the viewer.

You can also interact directly with the overview map to influence the display of the Keyhole client 3D viewer itself. Click on any position on the map and both the overview display and the Keyhole client 3D viewer will adjust position to the point

in the overview map that you click on. For example, if the current view is located in the United States, you can click on the African continent and both the overview indicator and the 3D viewer will move to the new position.

## Using External GIS data in the Overview Window

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For Keyhole EC users, the overview map feature displays data from GIS sources other than the Keyhole Server software. These sources provide their data over the internet using a GIS specification known as *Web Mapping Server*, or WMS. In this way, the Keyhole client acts as the primary interface to provide easy navigation through many different GIS databases. Along with the advantage of mining deeper databases, you can use the Keyhole client interaction to bypass the cumbersome navigation response of most browser-based GIS databases.

For example, you could use the GIS information provided by Cumulative Exposure Project Maps to view various environmental impact studies. After loading the map provided by the service, you can use the Keyhole client to quickly navigate to and zoom in on the area you are interested in, click on the Refresh Map button in the overview preference panel, and view the available data that corresponds to the region you have selected. Or, if your organization has data already available in WMS format, you can access it and use the Keyhole client to interact with it.

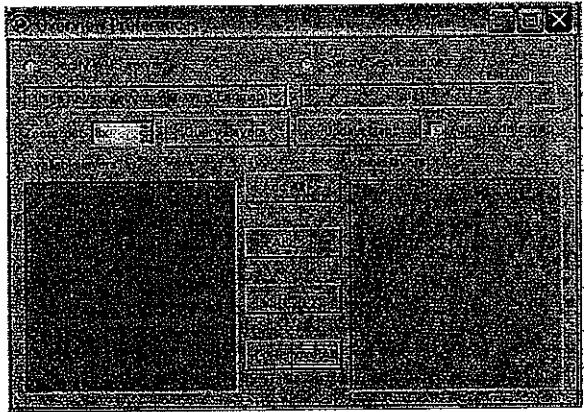
Examples of other available data include climate forecast data, geocoding services, environmental studies reports, census reports, or county parcel and zoning information. You can find a list of WMS providers by using a web search engine. Typical providers include NASA and USGS, which offers various data sets.

## Setting a Web Mapping Server

By default, the Keyhole PRO client uses a single source image as the default overview map. To set a Web Mapping Server as the overview map, follow the steps below.

1. Turn on the Overview window and click on the Prefs button.

The Overview Preferences dialog appears.



The settings for the default WMS Server appear in the text boxes. These are greyed out by default.

2. Set the web mapping server.

Click on the **Specify WMS server** radio button and enter the URL for your server in the text box below.

The website URL varies in structure between WMS service providers. However, service providers typically use a web-based application or CGI to deliver the information over the web. Consequently, common URLs contain the following extensions or strings:

- .cgi
- .pl
- .asp
- servlet (in the URL)

If the URL string contains `esrimap` followed by a `servicename` string, you will need to provide that string in a separate field (see Step 3 below). Otherwise, enter all the information up to the end of the string, but do not include characters such as question marks.

### 3. Set the service name.

If necessary, click the **Specify Servicename** radio button. You will only need to do this if the server URL contains `Esrimap` in the string. If it does, enter the service name keyword followed by its value in the field. The example below illustrates where to find the service name in a string.

[http://gisdata.usgs.net/servlet/com.esri.wrms.Esrimap?servicename=USGS\\_VMS\\_NED&](http://gisdata.usgs.net/servlet/com.esri.wrms.Esrimap?servicename=USGS_VMS_NED&)

WMS Server address | Service name value

The question mark (?) is not used in either the server address or the service name.

#### 4. Set the zoom level. (Optional)

Adjust the **Zoom out** selector to your preference. This sets the elevation viewing level in the WMS map displayed in the Overview window. By default, it is set to 8 times (8x) the area displayed in the Keyhole client viewer. If you want a one-to-one correspondence between the overview display and the Keyhole client 3D viewer display, set the value to 1x, and so on for different ratios. See ["Using the Zoom Feature"](#) on page 84 for more detail.

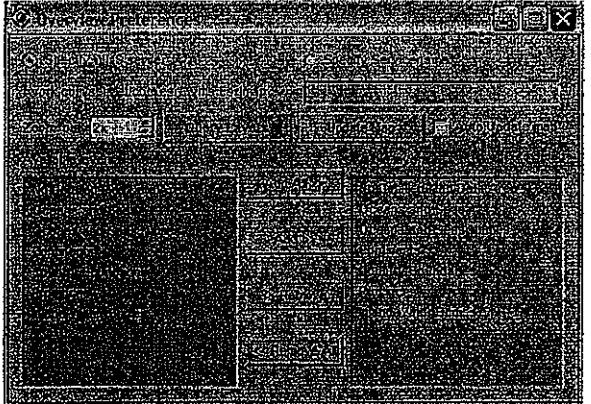
## 5. Retrieve the map data.

Click on the **Query Layers** button to retrieve the imagery data from the WMS server. The button will grey out until the data is retrieved, which varies depending upon the server's response time. You will see the data appear in the Available layers window on the left.

6. Select layers to display in the overview map.

Using the buttons between the layers display windows, select individual layers that you want to add to the overview map, or click on the Add All

button to add all layers to the overview display. To remove layers, click on an entry in the **Visible layers** window and click the **Remove** button.



**Note:** You must select at least one layer from the server data in order for the overview map feature to work.

**7. Apply changes.**

Click the **OK** button to apply your changes and return to the Keyhole client work area.

**8. Refresh the Map.**

To apply your settings to the **Overview** window, click on the **Update Map** button. This action retrieves the data in from the map server and adjusts the display to the settings in the preferences.

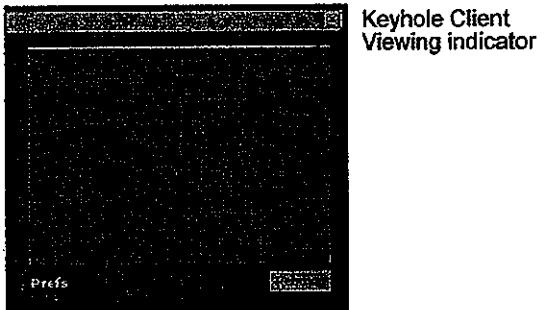
**Note:** Each time you adjust the display in the Keyhole client viewer, you must click on the **Update Map** button to see the corresponding display from the WMS server you selected. You can check the **Auto Update map** check box to automatically retrieve data from the WMS server each time you change a position in the Keyhole client viewer, but this will most likely result in a slow response from the mapping server and will put unnecessary load on the server as well. Use this option sparingly.

As you enter additional WMS servers in the Preferences dialog, prior entries are saved to the drop-down menu should you wish to view the data again. Up to fifteen entries are saved.

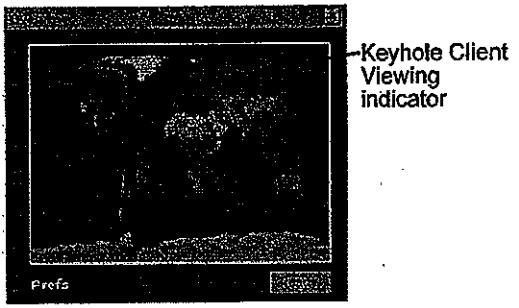
## Using the Zoom Feature

The zoom feature is a key part of understanding how the overview map feature works. Depending upon the value set in the Zoom out field in the preferences, you will see a wider point of view in the Overview window than is displayed in the Keyhole client viewer itself. However, if you set the value to 1x, the view in the Overview window display will exactly correspond to that in the Keyhole client viewer.

In the following example, the zoom value for the Overview is set to 5x. The red rectangle in the center of the display indicates the boundaries of the Keyhole client viewer, which is zoomed in to downtown Chicago. Suburbs of Chicago displayed in the Overview window outside the rectangle do not appear in the viewer.



The default zoom settings for the standard WMS server is eight times (8x) the display of the Keyhole client viewer. As you zoom into a high level of detail in the Keyhole client, the Overview window can provide an overall contextual view of your current position. This is particularly useful when you enter address information and immediately zoom to a detailed location. In the following example, the viewer is zoomed into the city of Chicago, and the Overview map is set to its default zoom value, which shows the overall context of the 3D viewer in relationship to the earth.



On the other hand, if you want a greater level of detail in the Overview window, you might set the zoom level to match the display in the Keyhole client viewer. This is useful when you are retrieving geocoder data, for example, and want to see points of interest or other detailed information only available in the Overview window.

## Interacting with the Overview Map Display

There are two ways to interact with the data displayed by the WMS server.

- **Client method**

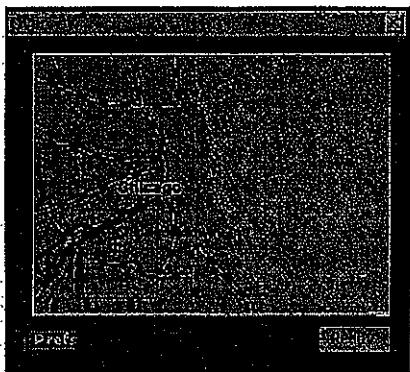
Navigate to the area you want to inspect via the Keyhole client, and refresh the overview map to display the new region and its data in the overview window.

- **Overview method**

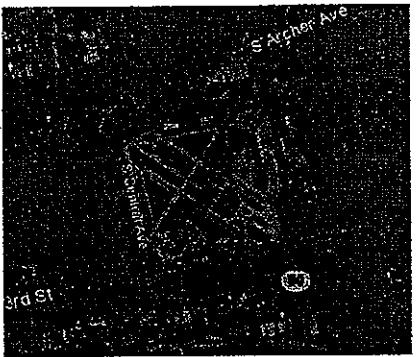
Using the Overview window, click and hold a point outside the viewing indicator in the direction you want to investigate. As you do so, the Keyhole client viewer will shift position toward that location and the viewing indicator will move in the direction that you click on.

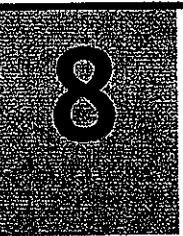
Both of these navigation methods are helpful in exploring data in the WMS database. The following steps illustrate a sample process using both types of navigation.

1. The Keyhole client is first used to navigate to the greater Chicago area, with the overview feature set to three times the viewer area (Client method).
2. The Overview window is refreshed, and the geocoder data is displayed with an airport icon near the city, but outside the viewing indicator.
3. The viewing indicator is positioned around the airport icon by clicking on the Overview window in the direction of the airport (Overview method).



The adjusted display in the Keyhole client viewer now corresponds to the viewing indicator in the geocoder map, so a side-by-side comparison can be made of both views.





## Printing

You can print your current view by selecting Print from the File menu. Image overlays and other labeling data are also printed if they are visible.

Depending upon your print output size, you can select the Aspect Ratio from the View menu for the best printing results. For example, if you are printing a view to a 5" x 7" landscape, you can choose that ratio from the Aspect Ratio menu item. Once you do, the Keyhole client will resize the viewing window accordingly.

Keyhole Pro users can use high-resolution printing to print high-resolution images from the Keyhole client up to 11 x 17 inches. For best results, follow the instructions in [“High-Resolution Printing”](#) on page 103 of **Keyhole Imagery**.

**Note:** If you have purchased the Premium Printing module for Keyhole Pro or if you are a Keyhole EC user, you can print higher resolution images—up to 3000 pixels. Simply select Premium Printing as the printing resolution.



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# Using Custom Imagery In Keyhole

You can use the import feature of the Keyhole software to place custom images into your viewer. These images function as *overlays* to a given view as a means to provide additional information about the underlying terrain. The transparency of the image can be adjusted to view more or less of the underlying imagery, and the overlay conforms to the shape of the terrain itself.

For example, you might use an image of a site plan as an overlay to a particular plot of land being developed by your company. By adjusting the transparency of the overlay image, you can see how the site plan corresponds to the viewer imagery of the plot. By turning on terrain in the viewer, you will also be able to see how the plan integrates with hilly terrain. Thus, the combination of the overlay and the viewer imagery gives more information than either one by itself.

An overlay file tells your Keyhole client three things:

- **what file to pull into the viewer** (from your computer, from your network, or from a website)
- **where to place the file on the globe**
- **what transparency settings** to use for the image

The sections below describe how to create, save, view, and email overlays using the Keyhole client.

## Overlay Requirements

Overlay images can be taken from your computer, from your network, or from a website. The image format must be:

- JPG
- BMP
- TIFF
- PNG
- TGA